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L1: Entry 1 of 2

File: JPAB

Jun 14, 1994

PUB-NO: JP406166303A

DOCUMENT-IDENTIFIER: JP 06166303 A

TITLE: PNEUMATIC TIRE

PUBN-DATE: June 14, 1994

## INVENTOR-INFORMATION:

NAME

COUNTRY

TSUYUKI, KUNIO

## ASSIGNEE-INFORMATION:

NAME

COUNTRY

YOKOHAMA RUBBER CO LTD:THE

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APPL-NO: JP04321884

APPL-DATE: December 1, 1992

US-CL-CURRENT: 152/209.12

INT-CL (IPC): B60C 11/08; B60C 11/03; B60C 11/04; B60C 11/11

## ABSTRACT:

PURPOSE: To provide a pneumatic tire wherein noise is reduced without lowering its water discharging performance and maneuvering stability in the tire with block patterns.

CONSTITUTION: Many blocks 4 divided by a plurality of main grooves 2 extending in the circumferential direction and a plurality of sub-grooves 3 crossing these main grooves and extending in the cross direction of a tire are formed by providing these main grooves 2 and sub-grooves 3 on a tread 1. In a pneumatic tire with block patterns wherein the rotary direction is designated in one direction, the angle  $\beta$  between the wall face of a sub-groove in the kicking- out side of a block 4 and the normal of a tread is made  $10^\circ$  or more, and the angle  $\alpha$  between the wall face of a sub-groove in the step-in side of the block 4 and the normal line of the tread is also made smaller than the angle 4 in the kicking side by  $5^\circ$  or more.

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L1: Entry 2 of 2

File: DWPI

Jun 14, 1994

DERWENT-ACC-NO: 1994-230507  
DERWENT-WEEK: 199428  
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TITLE: Block pattern pneumatic tyre with reduced tyre noise - having tread of directional block pattern in which wall of lateral groove is inclined to tread normal at specified angle

PATENT-ASSIGNEE:

ASSIGNEE

YOKOHAMA RUBBER CO LTD

CODE

YOKO

PRIORITY-DATA: 1992JP-0321884 (December 1, 1992)

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PATENT-FAMILY:

| PUB-NO   | PUB-DATE      | LANGUAGE | PAGES | MAIN-IPC   |
|--|---------------|----------|-------|------------|
| <input type="checkbox"/> <a href="#">JP 06166303 A</a> | June 14, 1994 |          | 003   | B60C011/08 |

APPLICATION-DATA:

| PUB-NO       | APPL-DATE        | APPL-NO        | DESCRIPTOR |
|--------------|------------------|----------------|------------|
| JP 06166303A | December 1, 1992 | 1992JP-0321884 |            |

INT-CL (IPC): B60C 11/03; B60C 11/04; B60C 11/08; B60C 11/11

ABSTRACTED-PUB-NO: JP 06166303A

BASIC-ABSTRACT:

A pneumatic tyre has a tread of directional block pattern with definite rotating direction, which has many blocks on the tread bounded by several circumferential grooves and many lateral grooves crosssing them in the tyre's axial direction. The wall of the lateral groove on the start up side is inclined to the tread normal with the angle beta larger than 10 deg., while the wall on the step in side of the block is inclined to the tread normal with the angle alpha, which is smaller than the angle beta by over 5 deg.

ADVANTAGE - The tyre's pattern noise is reduced, without deteriorating the drainage property and steering stability.

CHOSEN-DRAWING: Dwg.0/3

TITLE-TERMS: BLOCK PATTERN PNEUMATIC TYRE REDUCE TYRE NOISE TREAD DIRECTION BLOCK PATTERN WALL LATERAL GROOVE INCLINE TREAD NORMAL SPECIFIED ANGLE

DERWENT-CLASS: A95 Q11

CPI-CODES: A12-T01B;

ENHANCED-POLYMER-INDEXING:

Polymer Index [1.1] 017 ; H0124\*R Polymer Index [1.2] 017 ; ND01 ; K9416 ; B9999  
B3974\*R B3963 B3930 B3838 B3747 ; Q9999 Q9256\*R Q9212

POLYMER-MULTIPUNCH-CODES-AND-KEY-SERIALS:

Key Serials: 0009 0231 2624 2826 3258

Multipunch Codes: 017 032 04- 41& 50& 551 560 562 651 672 699

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1994-104955

Non-CPI Secondary Accession Numbers: N1994-182234

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(19)日本国特許庁(JP)

(12) 公開特許公報(A)

(11)特許出願公開番号

特開平6-166303

(43)公開日 平成6年(1994)6月14日

| (51)Int.Cl. <sup>5</sup> | 識別記号  | 庁内整理番号    | FI | 技術表示箇所 |
|--------------------------|-------|-----------|----|--------|
| B 6 0 C                  | 11/08 | Z 8408-3D |    |        |
|                          | 11/03 | Z 8408-3D |    |        |
|                          | 11/04 | D 8408-3D |    |        |
|                          | 11/11 | E 8408-3D |    |        |
|                          |       | Z 8408-3D |    |        |

審査請求 未請求 請求項の数1(全 3 頁)

(21)出願番号 特願平4-321884

(22)出願日 平成4年(1992)12月1日

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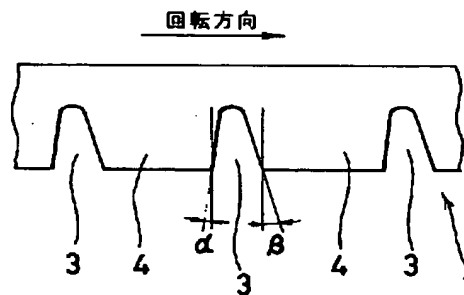
(74)代理人 弁理士 小川 信一 (外2名)

(54)【発明の名称】 空気入りタイヤ

(57)【要約】

【目的】 ブロックパターンを有するタイヤにおいて、その排水性や操縦安定性を低下させずに騒音を低減させるようにした空気入りタイヤを提供する。

【構成】 路面1にタイヤ周方向に延びる複数の主溝2と、この主溝2に交差してタイヤ幅方向に延びる複数の副溝3とを設けることにより、これら主溝2と副溝3とに区分された多数のブロック4を形成し、その回転方向が一方に指定された方向性ブロックパターンを有する空気入りタイヤにおいて、ブロック4の蹴出し側の副溝壁面が路面法線となす角度 $\beta$ を $10^\circ$ 以上にすると共に、ブロック4の踏込み側の副溝壁面が路面法線となす角度 $\alpha$ を蹴出し側の角度 $\beta$ よりも $5^\circ$ 以上小さくする。



## 【特許請求の範囲】

【請求項1】 路面にタイヤ周方向に延びる複数の主溝と、該主溝に交差してタイヤ幅方向に延びる複数の副溝とを設けることにより、これら主溝と副溝とに区分された多数のブロックを形成し、その回転方向が一方に指定された方向性ブロックパターンを有する空気入りタイヤにおいて、前記ブロックの蹴出し側の副溝壁面が路面法線となす角度 $\beta$ を $10^\circ$ 以上にすると共に、該ブロックの踏み込み側の副溝壁面が路面法線となす角度 $\alpha$ を前記蹴出し側の角度 $\beta$ よりも $5^\circ$ 以上小さくした空気入りタイヤ。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、走行時に発生する騒音を低減させたブロックパターンを有する空気入りタイヤに関する。

【0002】

【従来の技術】従来、タイヤ路面に、タイヤ周方向に延びる主溝とこの主溝に交差するタイヤ幅方向に延びる副溝とでブロックを形成したブロックパターンを有するタイヤは、リップパターンを有するタイヤに比べて副溝によって十分な排水性を確保することができる。しかしその一方で、大きな騒音を発生するという欠点があった。この騒音の発生は、図3に示すように接地路面内で圧縮されると共に、タイヤ回転方向と反対側に撓むように変形していたブロックBが蹴出した直後に急激に開放されて振動することにより起こすものであり、特に偏平タイヤではこの現象が顕著であった。

【0003】このようなブロックパターンによる騒音の低減対策としては、副溝を減少させたり、タイヤ接地幅を減少させる等の提案があるが、これらの対策はブロックパターン本来の排水性を低下したり、操縦安定性の低下を招くという問題を生ずるため、本質的な騒音低減対策となるものではなかった。

【0004】

【発明が解決しようとする課題】本発明の目的は、ブロックパターンを有するタイヤにおいて、その排水性（ウェット性能）や操縦安定性を低下させずに騒音を低減させるようにした空気入りタイヤを提供することにある。

【0005】

【課題を解決するための手段】上記目的を達成するための本発明は、路面にタイヤ周方向に延びる複数の主溝と、該主溝に交差してタイヤ幅方向に延びる複数の副溝とを設けることにより、これら主溝と副溝とに区分された多数のブロックを形成し、その回転方向が一方に指定された方向性ブロックパターンを有する空気入りタイヤにおいて、前記ブロックの蹴出し側の副溝壁面が路面法線となす角度 $\beta$ を $10^\circ$ 以上にすると共に、該ブロックの踏み込み側の副溝壁面が路面法線となす角度 $\alpha$ を前記蹴出し側の角度 $\beta$ よりも $5^\circ$ 以上小さくしたことを特徴

とする。

【0006】このように、方向性のブロックパターンをもつタイヤにおいて、ブロックの蹴出し側の副溝壁面角度 $\beta$ を $10^\circ$ 以上で、踏み込み側の副溝壁面角度 $\alpha$ よりも大きくしたことによって蹴出し側の剛性を大きくし、ブロックの蹴り出し直後の振動を抑制するため、騒音の発生を低減する。また、踏み込み側の副溝壁面角度 $\alpha$ を蹴出し側の角度 $\beta$ より $5^\circ$ 以上小さくしたことによって踏み込み側の剛性を小さくし、ブロック踏み込み時の打撃による騒音も低減する。しかも、上記作用により実質的に副溝数や接地幅を減少させる必要がないため、ウェット性能や操縦安定性を低下することがない。

【0007】以下に、図を参照して本発明のタイヤにつき詳しく説明する。図1は本発明の実施例からなる空気入りタイヤのトレッドパターンを示すものである。図はタイヤ回転方向が矢印方向に指定された方向性ブロックパターンであって、タイヤ路面1に、周方向に複数本の主溝2とこの主溝2に交差するタイヤ幅方向に延びる複数の副溝3とが設けられており、これら主溝2と副溝3とに囲まれた多数のブロック4が形成されている。

【0008】図2に示すように、ブロック4は、その前後の副溝3の溝壁面角度が異ならせてある。すなわち、ブロック4の蹴出し側の副溝3の壁面が路面法線となす角度 $\beta$ が、踏み込み側の副溝3の壁面が路面法線となす角度 $\alpha$ よりも大きくしてあり、その蹴出し側角度 $\beta$ を $10^\circ$ 以上、好ましくは $10^\circ \sim 30^\circ$ にしてある。このような大きな角度 $\beta$ によってブロックの蹴出し側の剛性が大きくなり、接地路面内で圧縮された状態から、蹴出し側へ急激に開放されるときブロックの振動を抑制するため、騒音の発生を低減する。

【0009】また、踏み込み側角度 $\alpha$ は $0^\circ$ 以上であると共に、蹴出し側角度 $\beta$ よりも $5^\circ$ 以上、好ましくは $5^\circ \sim 15^\circ$ の範囲で小さくしてある。このように、踏み込み側角度 $\alpha$ を小さく抑えることによって踏み込み側の剛性を低減させ、ブロック4が路面に踏込むときの打撃音を低減することができる。また、上述のような溝角度 $\alpha$ 、 $\beta$ の調整だけで騒音の低減を行うので、副溝3や路面の接地幅は排水性や操縦安定性に必要な数や大きさを設定すればよく、ウェット性能や操縦安定性の低減をもたらすことはない。

【0010】

【発明の効果】上述したように本発明は、方向性ブロックパターンを有するタイヤにおいて、そのブロックの蹴出し側の副溝壁面角度 $\beta$ を踏み込み側の角度 $\alpha$ よりも大きくし、かつ $10^\circ$ 以上にしたため、ブロックが接地状態から蹴出し側に開放されるとき振動を抑制し、また踏み込み側の角度 $\alpha$ を蹴出し側の角度 $\beta$ より $5^\circ$ 以上小さくしたため、ブロック踏み込み時の打撃を小さくし、これらの総合作用により騒音を低減することができる。また、溝角度の調整により騒音低減を行い、副溝数や路面接地

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幅の変更を要しないため、ブロックパターン本来のウェット性能や操縦安定性を維持することができる。

【図面の簡単な説明】

【図1】本発明タイヤに設けたトレッドパターンの一例を示す平面図である。

【図2】図1のタイヤ周方向のA-A矢視断面図であ

る。

【図3】ブロックパターンを有する従来タイヤのブロックの動きを示すタイヤ周方向断面の説明図である。

【符号の説明】

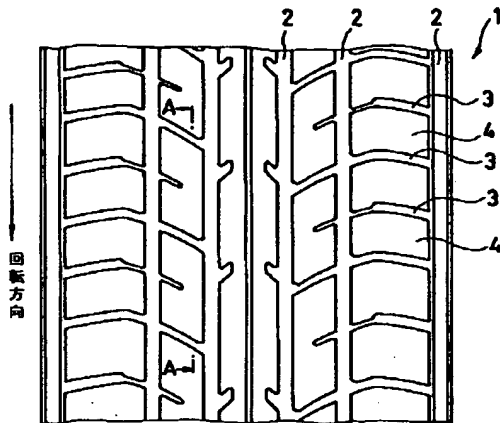
1 路面

2 主溝

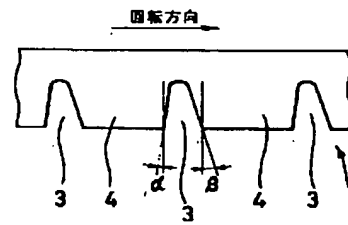
3 副溝

4 ブロック

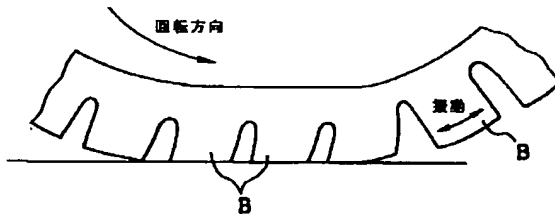
【図1】



【図2】



【図3】



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the pneumatic tire which has the block pattern which reduced the noise generated at the time of transit.

[0002]

[Description of the Prior Art] Conventionally, the tire which has the block pattern which formed the block by the minor groove prolonged crosswise [ tire ] intersects a tire tread at the major groove prolonged in a tire hoop direction and this major groove can secure sufficient wastewater nature by the minor groove compared with the tire which has a rib pattern. However, there was a fault of on the other hand generating the loud noise. Generating of this noise is caused by being opened wide rapidly [ immediately after the block B which was being transformed so that it might bend in a tire hand of cut and the opposite side carries out ejection ], and vibrating, and this phenomenon was especially remarkable with the flat tire while it was compressed within the touch-down tread to be shown in drawing 3.

[0003] Although the minor groove was decreased or there was a proposal of decreasing tire touch-down width of face as a cure against reduction of the noise by such block pattern, since these cures produced the problem of falling the wastewater nature of block pattern original, or causing the fall of driving stability, they were not the things used as the essential cure against a noise reduction.

[0004]

[Problem(s) to be Solved by the Invention] The purpose of this invention is in the tire which has a block pattern to offer the pneumatic tire it was made to reduce the noise, without reducing the wastewater nature (wet engine performance) and driving stability.

[0005]

[Means for Solving the Problem] This invention for attaining the above-mentioned purpose by preparing two or more major grooves prolonged in a tread in a tire hoop direction, and two or more minor grooves which intersect this major groove and are prolonged crosswise [ tire ] In the pneumatic tire which has the directivity block pattern with which the block of a large number classified into these major grooves and a minor groove was formed, and the hand of cut was specified as the one direction While making into 10 degrees or more the include angle beta of said block which a near minor groove wall surface makes with a tread normal by carrying out ejection, ejection is carried out and the minor groove wall surface by the side of treading in of this block is characterized for a tread normal and the include angle alpha to make by said thing [ having made it smaller 5 degrees or more than the near include angle beta ].

[0006] Thus, in a tire with the block pattern of directivity, in order to carry out ejection, to enlarge near rigidity, and for a block to begin to kick and to control the next vibration by the block having carried out ejection and having made the near minor groove wall surface include angle beta larger than the minor groove wall surface include angle alpha by the side of treading in at 10 degrees or more, generating of the noise is reduced. Moreover, by having carried out ejection of the minor groove wall surface include

angle alpha by the side of treading in, and having made it smaller 5 degrees or more than the near include angle beta, rigidity by the side of treading in is made small, and the noise by the blow at the time of block treading in is also reduced. And in order to decrease neither the number of minor grooves, nor touch-down width of face substantially according to the above-mentioned operation, neither the wet engine performance nor driving stability is fallen.

[0007] Below, with reference to drawing, it explains in detail per tire of this invention. Drawing 1 shows the tread pattern of the pneumatic tire which consists of an example of this invention. Drawing is the directivity block pattern with which the tire hand of cut was specified in the direction of an arrow head, two or more minor grooves 3 prolonged crosswise [ tire ] intersects the tire tread 1 in a hoop direction at two or more major grooves 2 and this major groove 2 are formed, and the block 4 of a large number surrounded by these major grooves 2 and the minor groove 3 is formed.

[0008] As shown in drawing 2 , whenever [ groove face face angle / of the minor groove 3 before and behind that ] has changed the block 4. namely, the include angle alpha which the wall surface of the minor groove 3 by the side of treading in makes [ the include angle beta of block 4 which carries out / the include angle / ejection and the wall surface of the near minor groove 3 makes with a tread normal ] with a tread normal -- large -- carrying out -- \*\*\*\* -- the -- ejection is carried out and beta 10 degrees or more is preferably made into 10 degrees - 30 degrees whenever [ lateral horn ]. Generating of the noise is reduced in order to control vibration of the block when carrying out ejection and being opened wide rapidly to a side from the condition of the block having carried out ejection with such a big include angle beta, and near rigidity having become large, and having been compressed within the touch-down tread.

[0009] Moreover, ejection of it is carried out and alpha is made [ whenever / treading-in lateral horn ] it is desirable and smaller in 5 degrees - 15 degrees than beta 5 degrees or more whenever [ lateral horn ] while it is 0 degrees or more. Thus, by stopping alpha small whenever [ treading-in lateral horn ], the rigidity by the side of treading in can be reduced, and a blow sound in case block 4 gets into a tread can be reduced. Moreover, since the noise is reduced only by adjustment of the above slot include angles alpha and beta, the touch-down width of face of a minor groove 3 or a tread does not bring about reduction of the wet engine performance or driving stability that what is necessary is just to set up a number and magnitude required for wastewater nature or driving stability.

[0010]

[Effect of the Invention] As mentioned above, in the tire which has a directivity block pattern, the block carries out ejection of this invention, and it makes the near minor groove wall surface include angle beta larger than the include angle alpha by the side of treading in, and it writes at 10 degrees or more.

Vibration in case a block carries out ejection from a touch-down condition and is opened wide at a side is controlled, and ejection of the include angle alpha by the side of treading in is carried out, from the near include angle beta, by 5 degrees or more, it can write small, the blow at the time of block treading in can be made small, and the noise can be reduced according to these comprehensive operations.

Moreover, since adjustment of a slot include angle performs a noise reduction and modification of the number of minor grooves or tread touch-down width of face is not required, the wet engine performance and driving stability of block pattern original are maintainable.

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CLAIMS

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[Claim(s)]

[Claim 1] By preparing two or more major grooves prolonged in a tread in a tire hoop direction, and two or more minor grooves which intersect this major groove and are prolonged crosswise [ tire ] In the pneumatic tire which has the directivity block pattern with which the block of a large number classified into these major grooves and a minor groove was formed, and the hand of cut was specified as the one direction It is said pneumatic tire which carried out ejection and which was made smaller 5 degrees or more than the near include angle beta about the include angle alpha which the minor groove wall surface by the side of treading in of this block makes with a tread normal while making into 10 degrees or more the include angle beta of said block which a near minor groove wall surface makes with a tread normal by carrying out ejection.

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